6.0 RECOMMENDATIONS

As the District Engineer, I have considered the environmental, social, and economic effects, the engineering feasibility, and the comments received from other resource agencies and the public during this LCA Study effort and plan formulation. Based upon the sum of this information, I am recommending for implementation the LCA Ecosystem Restoration Plan (LCA Plan) that includes the highest priority actions from among those considered during plan formulation. I am convinced that the LCA Plan would begin to reverse the current trend of degradation of Louisiana's coastal ecosystem, support Nationally significant living resources, provide a sustainable and diverse array of fish and wildlife habitats, reduce nitrogen delivery to offshore gulf waters, provide infrastructure protection, and make progress towards a more sustainable ecosystem.

The LCA Plan I am recommending has seven components, with such modifications thereof as in the discretion of the Commander, HQUSACE, may be advisable.

A comparison of the cost effectiveness of the LCA Plan versus the final array of coastwide frameworks from which the LCA Plan was derived shows that the LCA Plan produces a lesser magnitude of output. However the efficiency of the LCA Plan is comparable to that of the larger frameworks in the final array. The comparison of the LCA Plan and the final array of coastwide frameworks is presented in **table MR 6-1**.

Table MR 6-1
LCA Plan and Final Array of Coastwide Frameworks

Plan	Subprovince Framework Codes	Average Annual Benefits ^	Average Annual Costs
LCA Plan		**2865**	**$ 55,921,000**
5610	S1M2, S2M3, S3R1	3094	171,479,754
5110	S1M2, S2R1, S3R1	3098	159,643,014
5410	S1M2, S2M1, S3R1	3110	185,416,495
10130	S1-3 N3*	3134	179,073,919
7610	S1E1, S2M3, S3R1	3166	193,662,284
7410	S1E1, S2M1, S3R1	3182	207,599,025
7002	S1E1, S2E3, S3M1	3202	542,511,742

*Plan developed by modification of plan 5110.
^Based on a composite of land building, habitat suitability, and nitrogen removal.

The ecologic model output for land building estimates that the LCA Plan would offset approximately 62.5 percent of the 462,000 acres projected to be lost within the Louisiana coastal area under the Future Without-Project condition. The estimated land building for Subprovince 1 exceeds projected Future Without-Project condition. In Subprovinces 2 and 3, the models estimated that the LCA Plan prevented almost 50 percent of the expected losses in each basin. These estimates do not include any projects in Subprovince 4.

The LCA Plan presents significant capacity for the prevention of future wetland loss with a smaller component of wetland building capacity. Although the LCA Plan acts significantly to reduce future loss of ecosystem structure and function, overall levels of environmental outputs will remain significantly reduced compared to historical conditions. This is especially true in Subprovince 4 where limited actions are recommended in the LCA Plan.

The cost of the five Near-Term Critical Restoration Features recommended for specific Congressional authorization, with implementation subject to Secretary of the Army review and approval of feasibility-level decision documents, (referred to as "Conditionally authorized" elsewhere in the report) is estimated at $864,065,000. The total cost of the Science and Technology Program, the Demonstration Projects, the Program for the Beneficial Use of Dredged Material, and Investigations of Modifications of Existing Structures is estimated at $310,000,000. The combined total cost of the previously stated components of the LCA Plan is estimated at $1,174,065,000. The total costs of Other Near-Term Critical Restoration Features Requiring Future Congressional Construction Authorization and Large-Scale and Long-Term Concepts Requiring Detailed Study is estimated to be $821,916,000. The total cost of the LCA Plan is estimated to be $1,995,981,000. Currently, the annual operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) costs are estimated at $7,883,000. OMRR&R costs are the responsibility of the non-Federal sponsor. These costs can be found in table **MR 6-3** through **MR 6-5**.

THE SEVEN COMPONENTS OF THE LCA PLAN

1. Near-Term Critical Restoration Features for Conditional Authorization. The LCA Plan includes 15 near-term critical restoration features (listed in tables **MR 6-2a** and **MR 6-2b**), five of which are recommended for specific Congressional authorization, with implementation subject to Secretary of the Army review and approval of feasibility-level decision documents. Implementation of these five restoration features would be subject to subsequent NEPA compliance, and appropriate decision documents. These decision documents would be constructed utilizing current policy and guidelines to provided a sound basis for decision makers at all levels. I recommend that Congress authorize implementation of the five near-term critical restoration features detailed below, with implementation subject to review and approval of the decision documents by the Secretary of the Army.

Studies or design of the five near-term features have been advanced to a state of readiness that suggest the feasibility-level decision documents can be completed prior to the next WRDA. In addition, initial analysis indicates that these five features address the most critical ecological needs of the coastal area in locations where delaying action would result in a "loss of opportunity" to achieve restoration and/or much greater restoration costs. These five critical near-term features present a range of effects essential for success in restoring the Louisiana coast. The benefits provided by these features include: sustainable reintroduction of riverine resources; rebuilding of wetlands in areas at high risk for future loss, the preservation and maintenance of critical coastal geomorphic structures; preservation of critical areas within the coastal ecosystem; and, the opportunity to begin to identify and evaluate potential long-term solutions. Based on a body of work both preceding and including this study effort, the PDT produced an estimate of average annual costs and benefits for these five features. This

information shows that average annual environmental output for these five authorized features would be on the order of 22,000 habitat units at an average annualized cost of $2,700 per unit provided.

The five near-term critical restoration features that I recommend for specific Congressional authorization, with implementation subject to Secretary of the Army review and approval of feasibility-level decision documents are:

- MRGO Environmental Restoration Features
- Small Diversion at Hope Canal [1]
- Barataria Basin Barrier Shoreline Restoration
- Small Bayou Lafourche Reintroduction [1]
- Medium Diversion with Dedicated Dredging at Myrtle Grove [1]

2. Science & Technology (S&T) Program. I recommend that the LCA S&T Program be programmatically authorized and funded at an amount not to exceed $100 million over the initial 10 years of the LCA Program. This S&T Program would support all facets of program implementation by providing for acquisition of data, developing analytic tools, and providing recommendations to the LCA Program Manager within the adaptive management framework. Major benefits of the S&T Program would be reduced scientific and technological uncertainties and optimized attainment of LCA Program restoration objectives.

3. Science and Technology Program Demonstration Projects: I recommend that demonstration projects recommended by the S&T Program be programmatically authorized, with implementation subject to Secretary of the Army review and approval of feasibility-level decision documents, and funded as a construction item at an amount not to exceed $100 million over 10 years, including a maximum cost of $25 million per project. Demonstration projects would serve to reduce critical uncertainties and provide valuable lessons learned to improve overall program performance. I recommend that Congress authorize implementation of the $100 million demonstration program subject to review and approval of individual project feasibility-level decision documents by the Secretary of the Army. In addition to standard decision document information, the demonstration project documents would address:

- Major scientific or technological uncertainties to be resolved; and
- A monitoring and assessment plan to ensure that the demonstration projects would provide results that contribute to overall LCA Program effectiveness.

The purpose of the recommended LCA S&T Program demonstration projects is to resolve critical areas of scientific, technical, or engineering uncertainty while providing meaningful restoration benefits whenever possible. The types of uncertainty that are best resolved through implementation of appropriately scaled demonstration projects are the "Type 2" uncertainties introduced in section 3.1.1. After design, construction, monitoring, and assessment of individual demonstration projects, the LCA program will leverage the lessons learned to improve the planning, design, and implementation of other LCA restoration projects. Beyond

[1] Diversion / reintroduction sizes: Small diversion: 1000 cfs - 5000 cfs; Medium diversion: 5001 cfs - 15000 cfs; Large diversion - > 15000 cfs

serving to resolve the list of "Type 2" uncertainties detailed in this report, demonstration projects may be necessary to address uncertainties discovered in the course of individual project implementation or during the study of large-scale and long-term restoration concepts.

4. Programmatic Authorization for the Beneficial Use of Dredged Material. I recommend that Congress authorize $100 million over the initial 10 years of the LCA Program for execution of additional beneficial use of dredged material projects within the Louisiana coastal area. Based on the requested funds and a 10-year period of implementation, it is expected that this beneficial use program could contribute to the attainment of approximately 21,000 acres of newly created wetlands. I recommend that this program follow guidelines similar to the Section 204 Continuing Authorities beneficial use program that provides authority for the USACE to restore, protect, and create aquatic and wetland habitats in connection with construction or maintenance dredging of an authorized project.

5. Programmatic Authorization for Investigations of Modifications of Existing Structures. I recommend that Congress authorize $10 million over the initial 10 years of the program for use in studies of potential modification or rehabilitation of existing water resources structures and/or their operation management plans for the purpose of contributing to the attainment of LCA Plan restoration objectives. This authority would improve environmental performance within a project purpose by authorizing the use of LCA funds.

6. Near-Term Critical Restoration Features Recommended for Study and Future Congressional Authorization. In addition to the five critical near-term restoration features previously recommended and listed for Congressional authorization, with implementation subject to Secretary of the Army review and approval of feasibility-level decision documents, I recommend approval of funding for full development of feasibility reports for the other 10 LCA Plan features, for which the total study cost is $47,529,000. These features would be Congressionally authorized via future WRDA. The 10 features are:

- Multi-purpose operation of the Houma Navigation Canal Lock
- Terrebonne Basin barrier Shoreline Restoration
- Maintain land bridge between Caillou Lake and Gulf of Mexico
- Small diversion at Convent/Blind River
- Increase Amite River Diversion Canal influence by Gapping Banks
- Medium Diversion at White's Ditch
- Stabilize Gulf Shoreline at Point Au Fer Island
- Convey Atchafalaya River water to northern Terrebonne marshes
- Modification of Caernarvon Diversion
- Modification of Davis Pond Diversion

7. Large-Scale and Long-Term Concepts Requiring Detailed Study. I recommend development of studies that evaluate large-scale, long-term coastal restoration concepts. Investigations of the following six large-scale, long-term concepts will fully determine their potential for achieving restoration objectives beyond the critical needs, near-term focus of other

LCA Plan components. Upon completion of the studies, recommendations may be forwarded to Congress for consideration of authorization. The estimated cost of these studies is $60 million

- Mississippi River Hydrodynamic Study
- Mississippi River Delta Management Study
- Third Delta Study
- Chenier Plain Freshwater and Sediment Management and Allocation Reassessment Study
- Acadiana Bays Estuarine Restoration Study
- Upper Atchafalaya Basin Study

These studies and their resultant projects, if authorized and constructed, could significantly restore environmental conditions that existed prior to large-scale alteration of the natural system.

COST SHARING AND AGENCY RESPONSIBILITIES

I further recommend Federal and Non-Federal Sponsor responsibilities and cost sharing requirements as set forth in preceding Section 4.7 "Division of Responsibilities" and the credit for non-Federal work-in-kind as set forth in preceding Section 4.10 "Recommended Credit for Non-Federal Work-in-Kind."

The recommendations contained herein reflect the information available at this time and current Department of the Army policies governing formulation of individual projects. They do not reflect program and budgeting priorities inherent in the formulation of a National Civil Works construction program nor the perspective of higher review levels within the Executive Branch. Consequently, the recommendations may be modified before they are transmitted to the Congress as proposals for authorization and implementation funding. However, prior to transmittal to the Congress, the sponsor, the state, interested Federal agencies, and other parties will be advised of any modifications and will be afforded an opportunity for further comment.

Peter J. Rowan
Colonel, U.S. Army
District Engineer

Table MR 6-2a. Components of the LCA Plan.

Recommended for Conditional or Programmatic Authorization
1. Near-term Critical Restoration Features • MRGO Environmental Restoration Features • Small Diversion at Hope Canal • Barataria Basin Barrier Shoreline Restoration, Caminada Headland, Shell Island • Small Bayou Lafourche Reintroduction • Medium Diversion with Dedicated Dredging at Myrtle Grove 2. S&T Program 3. Initial S&T Program Demonstration Projects • Marsh Restoration and/or Creation Using Non-Native Sediment • Marsh Restoration Using Long-Distance Conveyance of Sediment • Canal Restoration Using Different Methods • Shoreline Erosion Prevention Using Different Methods • Barrier Island Restoration Using Offshore and Riverine Sources of Sediment 4. Programmatic Authorization for the Beneficial Use of Dredged Material 5. Programmatic Authorization to Initiate Studies of Modifications to Existing Water Control Structures

Table MR 6-2b. Components of the LCA Plan.

Recommended for Approval With Future Authorization *(Implemented with Congressional Approval Authority)*
6. Other Near-term Critical Restoration Features • Multi-purpose Operation of Houma Navigation Canal Lock • Terrebonne Basin Barrier Shoreline Restoration • Maintain Land Bridge between Caillou Lake and Gulf of Mexico • Small Diversion at Convent / Blind River • Increase Amite River Diversion Canal Influence by Gapping Banks • Medium Diversion at White's Ditch • Stabilize Gulf Shoreline at Point Au Fer Island • Convey Atchafalaya River water to Northern Terrebonne Marshes • Modification of Caernarvon Diversion • Modification of Davis Pond Diversion 7. Large-scale and Long-term Concepts Requiring Detailed Study • Mississippi River Hydrodynamic Study • Mississippi River Delta Management Study • Third Delta Study • Chenier Plain Freshwater and Sediment Management and Allocation Reassessment Study • Acadiana Bays Estuarine Restoration Feasibility Study • Upper Atchafalaya Basin Study

Table MR-6-3
LCA Recommended Component Cost Estimates
(June 2004 Price Levels)

Item		Cost ($)
MRGO environmental restoration features		$ 80,000,000
Small diversion at Hope Canal		$ 10,645,000
Barataria Basin Barrier shoreline restoration		$ 181,000,000
Small Bayou Lafourche reintroduction		$ 75,280,000
Medium diversion with dedicated dredging at Myrtle Grove		$ 142,920,000
	SUBTOTAL	$ 489,845,000
LERRD		$ 178,619,000
First Cost	SUBTOTAL	$ 668,464,000
Feasibility-Level Decision Documents		$ 54,673,000
Preconstruction, Engineering, and Design (PED)		$ 36,252,000
Engineering and Design (E&D)		$ 29,018,000
Supervision and Administration (S&A)		$ 68,973,000
Project Monitoring		$ 6,685,000
Conditionally Authorized Cost	SUBTOTAL	**$ 864,065,000**
Science & Technology Program Cost (10 year Program)		**$ 100,000,000**
Demonstration Program Cost (10 year Program)*		**$ 100,000,000**
Beneficial Use of Dredged Material Program*		**$ 100,000,000**
Investigations of Modifications of Existing Structures		**$ 10,000,000**
Total Authorized LCA Plan Cost		**$ 1,174,065,000**
Multi-purpose operation of Houma Navigation Canal (HNC) Lock [#]		$ -
Terrebonne Basin Barrier shoreline restoration		$ 84,850,000
Maintain Land Bridge between Caillou Lake and Gulf of Mexico		$ 41,000,000
Small diversion at Convent / Blind River.		$ 28,564,000
Increase Amite River Diversion Canal influence by gapping banks		$ 2,855,000
Medium diversion at White's Ditch		$ 35,200,000
Stabilize Gulf shoreline at Point Au Fer Island		$ 32,000,000
Convey Atchafalaya River Water to Northern Terrebonne marshes		$ 132,200,000
Modification of Caernarvon diversion		$ 1,800,000
Modification of Davis Pond diversion		$ 1,800,000
	SUBTOTAL	$ 360,269,000
LERRD		$ 208,100,000
First Cost	SUBTOTAL	$ 568,369,000
Feasibility Level Decision Documents		$ 47,529,000
Preconstruction, Engineering, and Design (PED)		$ 36,027,000
Engineering & Design (E&D)		$ 45,635,000
Supervision & Administration (S&A)		$ 58,673,000
Project Monitoring		$ 5,683,000
Approved Projects Requiring Future Congressional Authorization for Construction		**$ 761,916,000**
Mississippi River Hydrodynamic Study		$ 10,250,000
Mississippi River Delta Management Study		$ 15,350,000
Third Delta Study		$ 15,290,000
Chenier Plain Freshwater and Sediment Management and Allocation Reassessment Study		$ 12,000,000
Acadiana Bays Estuarine Restoration Feasibility Study		$ 7,110,000
Upper Atchafalaya Basin Study^		$ -
Large-scale and Long Term Studies Cost	SUBTOTAL	**$ 60,000,000**
Total LCA Restoration Plan Cost		**$ 1,995,981,000**

*Program total costs include any estimated Real Estate costs for these activities
[#] Feature of the Mississippi River and Tributaries, Morganza Louisiana to the Gulf of Mexico Hurricane Protection project
^ Study to be funded under the Mississippi River and Tributaries authority

Table MR-6-4. Summary of LCA Plan Federal and Non-Federal Cost Share Responsibilities (June 2004 Price Levels)

Conditionally Authorized Features:		
Feasibility-level Decision and NEPA Documentation Cost:		
Federal (50%)	$	27,336,500
Non-Federal (50%)	$	27,336,500
Subtotal	$	54,673,000
Construction Cost (Including PED, E&D, S&A, Monitoring):		
Federal (65%)	$	500,768,550
Non-Federal (35%):		
LERRD*	$	178,619,000
Cash	$	130,004,450
Subtotal	$	809,392,000
Total	**$**	**864,065,000**
*For the conditionally authorized feature, Small Diversion at Hope Canal, LERRD exceeded 35% of the total project cost by $25,336,250, which is reimbursed to the non-federal sponsor.		
Programmatically Authorized Features:		
Science & Technology Program (10 year program)		
Federal (65%)	$	65,000,000
Non-Federal (35%)	$	35,000,000
Demonstration Program (10 year program)		
Federal (65%)	$	65,000,000
Non-Federal (35%)	$	35,000,000
Beneficial Use of Dredge Material Program		
Federal (75%)	$	75,000,000
Non-Federal (25%)	$	25,000,000
Investigations of Modifications of Existing Structures		
Federal (50%)	$	5,000,000
Non-Federal (50%)	$	5,000,000
Total	**$**	**310,000,000**
Conventionally Authorized Features:		
Feasibility-level Decision and NEPA Documentation Cost:		
Federal (65%)	$	23,764,500
Non-Federal (35%)	$	23,764,500
Subtotal	$	47,529,000
Construction Cost (Including PED, E&D, S&A, Monitoring):		
Federal (65%)	$	464,351,550
Non-Federal (35%)		
LERRD	$	208,100,000
Cash	$	41,935,450
Subtotal	$	714,387,000
Total	**$**	**761,916,000**
Large-scale, Long-term Studies for Future Congressional Authorization:		
Federal (50%)	$	30,000,000
Non-Federal (50%)	$	30,000,000
Total	**$**	**60,000,000**

Table MR-6-5
Average Annual O&M Cost Estimates for the LCA Plan Features
(June 2004 Price Levels)

Item		O&M Cost ($/yr)
MRGO Environmental Restoration Features	$	711,000
Small Diversion at Hope Canal	$	120,000
Barataria Basin Barrier Shoreline Restoration	$	500,000
Small Bayou Lafourche Reintroduction	$	1,400,000
Medium Diversion with Dedicated Dredging at Myrtle Grove	$	120,000
Total Conditionally Authorized Cost	$	2,851,000
Multi-purpose Operation of Houma Navigation Canal Lock	$	-
Terrebonne Basin Barrier Shoreline Restoration E. Timbalier, Isle Dernieres	$	2,760,000
Maintain Land Bridge between Caillou Lake and Gulf of Mexico	$	745,000
Small diversion at Convent / Blind River.	$	120,000
Increase Amite River Diversion Canal Influence by Gapping Banks	$	-
Medium Diversion at White's Ditch	$	120,000
Stabilize Gulf Shoreline at Point Au Fer Island	$	644,000
Convey Atchafalaya River Water to Northern Terrebonne Marshes	$	643,000
Total Future Congressionally Authorized Cost	$	5,032,000
Total Cost	**$**	**7,883,000**